UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte DANIEL M. CIMBORA, KAREN HEICHMAN, and PAUL L. BARTEL

Appeal 2007-1142
Application 10/035,344
Technology Center 1600

ON BRIEF

Before GRIMES, LINCK, and LEBOVITZ, *Administrative Patent Judges.*

LEBOVITZ, *Administrative Patent Judge.*

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claims 1, 46, and 48-50. We have jurisdiction under 35 U.S.C. § 6(b). We reverse the rejection under 35 U.S.C. § 112, first paragraph, for lack of written description; affirm the enablement rejection under 35 U.S.C. § 112, first paragraph; and set forth a new ground of rejection under 35 U.S.C. § 101 for lack of utility.

STATEMENT OF CASE

The claimed invention is directed to an isolated complex of a first and second protein. The first protein is an Akt kinase (AKT1 or AKT2). The second protein forms a "complex" with the Akt kinase. According to the specification, Akt kinases are involved in cell proliferation, apoptosis, survival of cerebellar neurons, pancreatic carcinoma, and insulin-regulated glucose transport (¶ 19). A yeast two-hybrid system was utilized by the inventors to identify proteins which interact with Akt kinases (¶¶ 15, 18). This system enables proteins to be selected which specifically bind to a "protein of interest," facilitating the discovery of "the complex network of interactions in a disease pathway." (¶¶ 18, 31-35.) Using the yeast two-hybrid system, the inventors identified several known proteins which interact with Akt kinases, including FNTA, TPRD, KIAA0728, PPL, Golgin-84, CLIC1, and AKR7A2 (¶¶ 22-28).

Claims 1, 46, and 48-50, which are all the pending claims, stand rejected under 35 U.S.C. § 112, first paragraph, for lack of written description and for lack of enablement (Br. 2-3). Appellants argue the claims as a group. We select claim 1, the only independent claim, as representative of each rejection. *See* 37 C.F.R. § 41.37(c)(1)(vii). It reads as follows:

> 1. An isolated protein complex comprising two proteins, the protein complex selected from the group consisting of:
>
> (i) a complex of a first protein and a second protein;
>
> (ii) a complex of a fragment of said first protein and said second protein;

(iii) a complex of said first protein and a fragment of said second protein; and

(iv) a complex of a fragment of said first protein and a fragment of said second protein, wherein said first and second proteins of (i)-(iv) are selected from the group consisting of:

(a) said first protein is AKT1or a homologue at least 90% identical thereto and said second protein is selected from the group consisting of FNTA, TPRD, KIAA0728, PPL and Golgin-84, or a homologue at least 90% identical thereto; and

(b) said first protein is AKT2 or a homologue at least 90% identical thereto and said second protein is selected from the group consisting of CLIC1, AKR7A2 and TPRD or a homologue at least 90% identical thereto.

ISSUES ON APPEAL

We frame the issues in this appeal as follows:

Does the specification provide an adequate written description under 35 U.S.C. § 112, first paragraph, of the claimed genus of first (having at least 90% sequence identity to AKT1 or AKT2) and second (having at least 90% sequence identity to FNTA, TPRD, KIAA0728, PPL, Golgin-84, CLIC1, or AKR7A2) proteins which are able to form a complex with one another?

Does the specification provide adequate guidance on how to use the claimed protein complex comprising the first and second protein?

CLAIM INTERPRETATION

To begin our analysis, we must first interpret the claim. Claim 1 is directed to a "complex of a first protein and a second protein." There are two types of complexes claimed: 1) AKT1 (first protein) complexed with

FNTA, TPRD, KIAA0728, PPL, or Golgin-84 (second protein); and 2) AKT2 (first protein) complexed with CLIC1, AKR7A2, or TPRD (second protein). Each of the first and second proteins can be selected from a genus of proteins ((claim 1(iv)(a) and (b), respectively) having at least 90% identity to the recited proteins. The protein which is "at least 90% identical thereto" is referred to in the claim as a "homologue."

The specification does not explicitly define the term "complex," but it is used in the specification to describe the product formed by a "protein-protein interaction" between the two proteins (Specification 25: 15-32). This interaction is mediated by "specific binding." (*Id.*) In other words, the proteins "bind" or stick together. According to the specification, the interaction was originally identified in a yeast two-hybrid system (*id.* at 21-22). Words in a claim are interpreted in view of the specification as they would be understood by one of skill in the art. In this light, we understand the term "complex" to mean that the first and second proteins are able to specifically bind to each other to form a "protein complex." There is no other protein activity required by the claim. In other words, the claim does not specify that the recited homologues have a functional activity other than the "specific binding" activity necessary to form the protein complex.

DISCUSSION

Rejection under § 112, first paragraph, for lack of written description

The Examiner contends that the claims lack written description because "the disclosure fails to describe the common attributes or characteristics that identify members of the genus, and because the genus is highly varia[ble]." (Answer 5.) Appellants contend "considerable

knowledge regarding the structure and function of the claimed proteins" was available prior to the application filing date, providing sufficient structural and functional information to define the genus (Br. 7-8).

"The 'written description' requirement [under 35 U.S.C. § 112, first paragraph] implements the principle that a patent must describe the technology that is sought to be patented; the requirement serves both to satisfy the inventor's obligation to disclose the technologic knowledge upon which the patent is based, and to demonstrate that the patentee was in possession of the invention that is claimed." *Capon v. Eshhar*, 418 F.3d 1349, 1357, 76 USPQ2d 1078, 1084 (Fed. Cir. 2005).

For claims to a genus of genetic materials, the Federal Circuit has imposed an additional requirement. "[A] generic statement such as 'vertebrate insulin cDNA' or 'mammalian insulin cDNA,' without more, is not an adequate written description of the genus because it does not distinguish the claimed genus from others, except by function." *University of California v. Eli Lilly & Co.*, 119 F.3d 1559, 1568, 43 USPQ2d 1398, 1406 (Fed. Cir. 1997). Instead, the written description must define the genus to enable one skilled in the art to "visualize or recognize the identity of the members of the genus," e.g., by providing a description of "structural features commonly possessed by members of the genus that distinguish them from others." *Lilly*, 119 F.3d at 1568, 43 USPQ2d at 1406.

In this case, all the proteins recited in claim 1 were known prior to the application filing date (Specification 23 (Table 11); ¶¶ 19-28). The application identifies the inventors' contribution as the "discovery" of "new protein-protein interactions" utilizing the known yeast two-hybrid system

(*id.* at ¶¶ 15-16). Thus, Appellants are not asserting that the proteins present in the claimed protein complex are novel. Rather, they are claiming the "discovery of novel protein-protein interactions" of already identified proteins (*id.* at 1: 10-12). It is unnecessary for the specification to provide a description of proteins which are already known in the prior art. *Capon*, 418 F.3d at 1357-58, 76 USPQ2d at 1084-85. In regard to the claimed limitation broadening these known proteins to variants ("homologues") having "at least 90%" identity, we consider the "at least 90%" identity to constitute a description, of the genus, as required by *Lilly*, because it defines the amount of sequence identity which must exist between genus members.

The only activity required by the claimed genus is that the first and second protein members must be able to bind to each other to form a protein complex.[1] *See supra* at p. 4. With respect to this binding activity, the written description identifies the regions of the proteins which specifically bind to each other when forming the protein complex in the yeast two-hybrid system (Specification 23 (Table 11, "COORDINATES")). These regions represent a structural feature possessed by members of the claimed genus which is necessary for binding activity.

In view of the fact that the yeast two-hybrid system is a well-known and highly exploited system for identifying protein-protein interactions (Specification ¶¶ 18, 31-35), we find that the disclosure of binding coordinates for representative species within the claim is sufficient to satisfy the written description requirement of § 112, first paragraph. "The

---

[1] It appears that the Examiner may incorrectly have required the claimed proteins to have an additional functional activity (Answer 4).

descriptive text needed to meet the [written description requirement] . . . varies with the nature and scope of the invention at issue, and with the scientific and technologic knowledge already in existence." *Capon v. Eshhar*, 418 F.3d 1349, 1357, 76 USPQ2d 1078, 1084 (Fed. Cir. 2005). Here, binding sequences that mediate protein complex formation in the yeast two-hybrid system were understood by the skilled worker and routinely determined, requiring no additional description in the instant application other than the disclosed protein binding regions.

In sum, the requirement of "at least 90%" identity and the disclosure of binding coordinates for representative species is sufficiently detailed to enable a person of skill in the art to recognize that applicants have invented what is claimed. *See LizardTech Inc. v. Earth Resource Mapping Inc.*, 424 F.3d 1336, 1344, 76 USPQ2d 1724, 1732 (Fed. Cir. 2005).

We do not understand § 112, first paragraph, to impose the strict requirement that a specification describe "critical residues for activity" in order to be a valid claim as demanded by the Examiner (Answer 4). In a case on the written description requirement for genetic materials, *Enzo Biochem. Inc. v. Gen-Probe Inc.* ("*Enzo*"), 323 F.3d 956, 63 USPQ2d 1609 (Fed. Cir. 2002), the court adopted standards set forth by the PTO in Guidelines for Examination of Patent Applications Under the 35 U.S.C. § 112, ¶ 1 "Written Description" Requirement, 66 Fed. Reg. 1099 (Jan. 5, 2001). According to these standards (as quoted in *Enzo*, 323 F.3d at 964, 63 USPQ2d at 1613), the written description requirement can be met by

> show[ing] that an invention is complete by disclosure of sufficiently detailed, relevant identifying characteristics ... i.e., complete or partial structure, other physical and/or chemical

> properties, functional characteristics when coupled with a known or disclosed correlation between function and structure, or some combination of such characteristics.

Guidelines for Examination of Patent Applications Under the 35 U.S.C. 112, ¶ 1 "Written Description" Requirement, 66 Fed. Reg. 1099 (Jan. 5, 2001). The Examiner has not explained why critical residues are required under this standard.

For the foregoing reasons, we reverse the rejection of claims 1, 46, and 48-50 for lack of written description.

Rejection under § 112, first paragraph, for lack of enablement

As explained in more detail below, a new ground of rejection has been entered under 35 U.S.C. § 101 for lack of utility. If a claim fails to meet the utility requirement of § 101 because it is not useful, then it necessarily fails to meet the how-to-use aspect of the enablement requirement of 35 U.S.C. § 112, first paragraph. *In re Fouche*, 439 F.2d 1237, 1243, 169 USPQ 429, 434 (CCPA 1971) (If "compositions are in fact useless, appellant's specification cannot have taught how to use them."); Manual of Patent Examination Procedures (MPEP) 2164.07 (Edition 8, August 2001; revised August 2006). Accordingly, we affirm the rejection of claims 1, 46, and 48-50 for lack of enablement but *only* for the reason that the skilled worker "would not know to use the [claimed protein] complex." (Answer 6.) Because our reasoning differs in part from the Examiner's, we designate it as a new ground of rejection.

NEW GROUND OF REJECTION

Utility under 35 U.S.C. § 101

To fulfill the utility requirement under 35 U.S.C. § 101, a claimed invention must have a substantial and specific utility. *See In re Fisher*, 421 F.3d 1365, 1371, 76 USPQ2d 1225, 1230 (Fed. Cir. 2005). A substantial utility means "show[ing] that an invention is useful to the public as disclosed in its current form, not that it may be useful at some future date after further research. Simply put, to satisfy the 'substantial' utility requirement, an asserted use must show that that claimed invention has a significant and presently available benefit to the public." *Id.* A specific utility is "a use which is not so vague as to be meaningless." *Id.* In other words, "in addition to providing a 'substantial' utility, an asserted use must show that th[e] claimed invention can be used to provide a well-defined and particular benefit to the public." *Id.*

In this case, the specification asserts that the protein complex is useful for diagnosing predisposition to "physiological disorders" (¶ 10), as a model for "physiological pathways, disorders, or diseases" (¶ 12), and for screening "drug candidates useful for treating a physiological disorder" (¶ 14). For each of the seven different AKT1 or AKT2 protein binding partners recited in the claims, the specification provides either no role or only a general suggested role for the interaction of the two proteins. For example, the specification states that the second protein may be a substrate for AKT1 (*e.g.*, PPL (¶ 23) and KIAA0728 (¶ 24)) or may be involved in signal transduction (*e.g.*, FNTA (¶ 22) and CLIC1 (¶ 28)). In two cases, the second protein is implicated in a disease pathway (*e.g.*, Golgin-84 (¶ 25) and TPRD

(¶ 26)), but the specification provides no evidence that the complex of it with AKT1 or AKT2 is associated with the disease pathway. In sum, the specification provides no information about the specific physiological pathway or disorder which is associated with the protein complex.

We find the assertion in the specification that the complex is useful because it is "involved in mammalian physiological pathways" insufficient to meet the utility requirement because it is neither substantial nor specific. In *In re Kirk*, 376 F.2d 936, 153 USPQ 48 (CCPA 1967), the applicant sought to patent new steroidal compounds alleged to be useful for their "biological activity" because "one skilled in the art would know how to use the compounds ... to take advantage of their presently-existing biological activity." *Kirk*, 376 F.2d at 939, 153 USPQ at 51. The court rejected the utility on the ground that it was not sufficiently "specific," but was instead "nebulous." *Id.*, at 941, 153 USPQ at 52. "[N]ebulous expressions, such as 'biological activity' or 'biological properties,' disclosed in a specification convey little explicit indication regarding the utility of a compound. *In re Kirk*, 376 F.2d 936, 941, 153 USPQ 48, 52 (CCPA 1967)." *Cross et al. v. Iizuka et al.*, 753 F.2d 1040, 1048, 224 USPQ 739, 745 (Fed. Cir. 1985). *See* also *In re Fisher*, 421 F.3d at 1371, 76 USPQ2d at 1230.

For similar reasons, we find that the utility requirement of § 101 is not met here. The phrase "physiological pathway" is just as nebulous as "biological activity" because it communicates nothing about the specific function of the protein in the cell or whole organism. The disclosure that complex may be involved signal transduction, phosphorylation, or any of the other broad activities disclosed in the application does not describe anything

about what the complex is useful for. In cases decided by the Federal Circuit and its predecessor court, a utility had been recognized when the claimed compounds had been identified to work in a specific physiological pathway. In *Nelson v. Bowler*, 626 F.2d 853, 206 USPQ 881 (CCPA 1980), the claimed compounds had been shown to possess pharmacological activity on blood pressure and smooth muscle function. In *Cross*, 753 F.2d at 1045, 224 USPQ at 747, the compounds had been shown to inhibit thromboxane synthetase in platelet microsomes. Summing the cases up, the *Cross* court held "adequate proof of any pharmacological activity constitutes a showing of practical utility." *Cross*, 753 F.2d at 1045, 224 USPQ at 747. In contrast to these cases, Appellants do not provide adequate evidence of a pharmacological activity or any specific function performed by the claimed complexes. Those skilled in the art would conclude that the specification does not disclose a substantial utility for the claimed method; i.e., an invention that is useful to the public in its current form, rather than potentially useful in the future after further research. *See Fisher*, 421 F.3d at 1371, 76 USPQ2d at 1230.

Although the Examiner had originally rejected the claims as lacking utility under § 101, the rejection was withdrawn "in view of Applicants' arguments that AKT1 and AKT2 are involved in cell proliferation and apoptosis and the claimed complexes can be used as therapeutic targets for such events." (Final Rejection 2.) While it is correct that AKT1 and AKT2 are described in the specification as having a known role in "cellular proliferation and apoptosis" (¶ 19), we find no evidence in the specification that the protein-protein interactions identified in the specification between

AKT1 or AKT2 and the recited second proteins (FNTA, TRPD, KIAA0728, PPL, Golgin-84, CLIC1, and AKR7A2) are involved in either of these processes. Accordingly, we find that the Examiner erred in withdrawing the rejection. Appellants do not explain in the specification how identifying an interaction between AKT1/AKT2 and another protein is evidence that the protein-protein complex is relevant to cellular proliferation and apoptosis, rather than some other physiological pathway. To the contrary, the specification explicitly states that Akt kinases are involved in other processes, including insulin-regulated glucose transport, activation of NFkB by TNF, and nuclear ion transport (Specification ¶¶ 19, 28). Thus, the specification does not teach that the protein complexes have a role in cell proliferation and apoptosis. In sum, no evidence is provided in the specification to associate the claimed complexes with any specific physiological pathway or function.

In the absence of a description of the specific physiological pathway through which the claimed protein-protein complex exerts its effect and how this would be useful in a concrete and specific way, we do not see how the specification can be found to disclose a specific and substantial utility for the claimed subject matter.

TIME PERIOD

This decision contains a new ground of rejection pursuant to 37 C.F.R. § 41.50(b) (effective September 13, 2004, 69 Fed. Reg. 49960 (August 12, 2004), 1286 Off. Gaz. Pat. Office 21 (September 7, 2004)). 37 CFR § 41.50(b) provides "[a] new ground of rejection pursuant to this paragraph shall not be considered final for judicial review."

37 C.F.R. § 41.50(b) also provides that the appellant, *WITHIN TWO MONTHS FROM THE DATE OF THE DECISION*, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of the appeal as to the rejected claims:

> (1) *Reopen prosecution.* Submit an appropriate amendment of the claims so rejected or new evidence relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the proceeding will be remanded to the examiner. . . .
>
> (2) *Request rehearing.* Request that the proceeding be reheard under § 41.52 by the Board upon the same record. . . .

Should the appellant elect to prosecute further before the examiner pursuant to 37 C.F.R. § 41.50(b)(1), in order to preserve the right to seek review under 35 U.S.C. §§ 141 or 145 with respect to the affirmed rejection, the effective date of the affirmance is deferred until conclusion of the prosecution before the examiner unless, as a mere incident to the limited prosecution, the affirmed rejection is overcome.

If the appellant elects prosecution before the examiner and this does not result in allowance of the application, abandonment or a second appeal, this case should be returned to the Board of Patent Appeals and Interferences for final action on the affirmed rejection, including any timely request for rehearing thereof.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED/§ 41.50(b)

Eric Grimes)
Administrative Patent Judge)
)
)
) BOARD OF PATENT
Nancy J. Linck)
Administrative Patent Judge) APPEALS AND
)
) INTERFERENCES
)
Richard M. Lebovitz)
Administrative Patent Judge)

Myriad Genetics Inc.
Intellecutal property Department
320 Wakara Way
Salt Lake, City UT 84108